UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/885,725	06/19/2001	Stale Petter Lyngstadaas	49949 (71432)	3309

21127 7590 10/03/2005

KUDIRKA & JOBSE, LLP
ONE STATE STREET
SUITE 800
BOSTON, MA 02109

EXAMINER	
DESAI, ANAND U	
ART UNIT	**PAPER NUMBER**
1653	

DATE MAILED: 10/03/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/885,725	LYNGSTADAAS ET AL.	
	Examiner	Art Unit	
	Anand U. Desai, Ph.D.	1653	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *19 June 2001*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-28* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-28* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *19 June 2001* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *20011018*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

SD

DETAILED ACTION

Priority

1. Acknowledgment is made of applicant's claim for foreign priority under 35 U.S.C. 119(a)-(d). The priority date is June 20, 2000.

Information Disclosure Statement

2. The information disclosure statement (IDS) submitted on October 18, 2001 is being considered by the examiner. The A.R. Ten Cate reference is not being initialed on the IDS because it missing page 198 of the reference.

Drawings

3. New corrected drawings in compliance with 37 CFR 1.121(d) are required in this application because the qualities being disclosed by the figure legends in the specification are not apparent. For example, there are no scale bars in figures 1-6. Applicant is advised to employ the services of a competent patent draftsperson outside the Office, as the U.S. Patent and Trademark Office no longer prepares new drawings. The corrected drawings are required in reply to the Office action to avoid abandonment of the application. The requirement for corrected drawings will not be held in abeyance.

Specification

4. The disclosure is objected to because of the following informalities:

5. The specification does not have section titled, "Brief Description of the Drawings". Suggest adding the appropriate Title before the figure descriptions. The Figure legends and the Drawing are not in agreement, for example, there is a description of a scale bar, and new dentin-

like tissue with a label (ND) in the legend of figure 1, but there is no scale bar or symbol on the drawing See MPEP 608.01(f). The specification identifies the figures using lower case, for example, figure 7a) and 7b), whereas the drawings are identified with upper case letters, Fig. 7A, and 7B. In addition figures 10-13 have both lower case and upper case identifiers in the drawings. Suggest correcting the case to match the "Brief Description of the Drawings" section of the specification.

Appropriate correction is required.

Claim Objections

6. Claims 7, and 9-22 are objected to because of the following informalities:

7. In claim 7, the specific recitation of amelin proteins in parentheses can cause confusion. Is the member of the Markush group amelins or the individual amelin proteins in parentheses? Suggest removing amelins and recite the specific amelin proteins encompassed by the claim. Appropriate correction is required.

8. Claims 9-22 are objected to under 37 CFR 1.75(c) as being in improper form because a multiple dependent claim cannot depend from any other multiple dependent claim. See MPEP § 608.01(n). Dependent claims 10, 12, 13, 15, 19, 20, and 22 are objected for depending on improper multiple dependent claims.

Double Patenting

9. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed.

Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970);and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

10. Claims 1, 7, and 8are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 7 of Cerny et al., U.S. Patent No. 6,300,062 B1. Although the conflicting claims are not identical, they are not patentably distinct from each other because Cerny et al. disclose that an effective amount of an amelin polypeptide (active enamel substance) can be used to promote or provoke mineralization of hard tissue, including dentin (see claim 7). The mineralization disclosed in claim 7 is required during the formation or regeneration of dentin, which is currently being claimed in claim 1. Cerny et al. also disclose a method of producing a polypeptide and a substantially pure polypeptide which comprises at least one sequence element selected from the group consisting of the tetrapeptides DGEA, VTKG, EKGE, and DKGE, where said polypeptide has a percentage amino acid sequence identity of at least 80% with SEQ ID NO: 2 or SEQ ID NO: 4 when said sequences are aligned, and percentage identity calculated (see claims 6-8, and 30-34, current application, claims 7, and 8).

A person of ordinary skill in the art would have been motivated to induce the regeneration of dentin over the exposed vital dental pulp tissue to cover the exposed surface from bacterial infection and to treat a dental defect. Therefore, it would have been obvious to the person having ordinary skill in the art to topically administer the amelin polypeptide disclosed by

Cerny et al. to promote the regeneration of dentin from an exposed dental pulp tissue after a dental procedure.

Claim Rejections - 35 USC § 101

11. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

12. Claims 1-22 are rejected under 35 U.S.C. 101 because the claimed recitation of a use, without setting forth any steps involved in the process, results in an improper definition of a process, i.e., results in a claim which is not a proper process claim under 35 U.S.C. 101. See for example *Ex parte Dunki*, 153 USPQ 678 (Bd.App. 1967) and *Clinical Products, Ltd.* v. *Brenner*, 255 F. Supp. 131, 149 USPQ 475 (D.D.C. 1966).

Claim Rejections - 35 USC § 112

13. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

14. Claims 1-28 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

15. Claims 1-22 provides for the use of an active enamel substance, but, since the claims do not set forth any steps involved in the method/process, it is unclear what method/process applicant is intending to encompass. A claim is indefinite where it merely recites a use without any active, positive steps delimiting how this use is actually practiced.

16. The phrase "such as" renders claims 8, 16, and 28 indefinite, because it is unclear whether the limitations following the phrase are part of the claimed invention. See MPEP § 2173.05(d). In claim 8, is the molecular weight at most 120 kDa or at most 60 kDa? In claim 28, is the corresponding amount from 0.0005 mg/cm^2 to 5 mg/cm^2, or 0.01 mg/cm^2 to 3 mg/cm^2?

17. In claims 8, and 16 the phrase, "such as, e.g." is redundant.

18. Claims 23-28 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential steps, such omission amounting to a gap between the steps. See MPEP § 2172.01. The omitted steps are: the method of identifying the formation or regeneration of dentin. How is one expected to know the method is accomplished unless the end result is identified?

19. In claims 12, and 28, the word, "about" prior to the amount of protein renders the claim indefinite. In claim 12, the phrase, "between about 5000 and about 25,000" renders the bounds unclear. In claim 28, what are the lower and upper limits, for the upper limit is 6 mg/cm^2 about 5 mg/cm^2?

20. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

21. Claims 6, 7, and 9-22 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter, which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the

claimed invention. Claim 6, and claims dependent upon claim 6 are drawn to a process of using an active enamel substance selected from enamel proteins and **derivatives thereof**. It is not clear what structural modifications for the recited enamel matrix **derivatives** would retain the functional properties characteristic for the particular enamel matrix proteins. The Court of Appeals for the Federal Circuit has recently held that a "written description of an invention involving a chemical genus, like a description of a chemical species, 'requires a precise definition, such as be structure, formula [or] chemical name,' of the claimed subject matter sufficient to distinguish it from other materials." *University of California v. Eli Lilly and Co.*, 1997 U.S. App. LEXIS 18221, at *23, quoting *Fiers v. Revel*, 25 USPQ2d 1601, 1606 (Fed. Cir. 1993) (bracketed material in original).

Just as the claims at issue in *UC v. Lilly* defined the invention by the function of the claimed DNA (encoding insulin), the instant claims define the claimed products only by their functional properties. The court held this sort of functional definition insufficient. "In claims involving chemical materials, generic formulae usually indicate with specificity what the generic claims encompass. One skilled in the art can distinguish such a formula from others and can identify many of the species that the claims encompass. Accordingly such a formula is normally an adequate description of the claimed genus. In claims to genetic material, however, a generic statement such as 'vertebrate insulin cDNA' or 'mammalian insulin cDNA,' without more, is not an adequate written description of the genus because it does not distinguish the genus from others, except by function. It does not specifically define any of the genes that fall within its definition. It does not define any structural features commonly possessed by members of the genus that distinguish them from others. One skilled in the art therefore cannot, as one can do

with a fully described genus, visualize or recognize the identity of the members of the genus. A definition by function, as we have previously indicated, does not suffice to define the genus because it is only an indication of what the gene does, rather than what it is." *UC v. Lilly*, at *24-*25, thus the above claims lack adequate written description.

Claim Rejections - 35 USC § 102/Claim Rejections - 35 USC § 103

22. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

23. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

24. Claims 1-3, 5-16, 18, 19, 21, and 22-28 are rejected under 35 U.S.C. 102(e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Cerny et al. U.S. Patent 6,300,062 B1.

25. Cerny et al. disclose a method of repairing a lesion in a tooth, the method comprising administering to a patient in need thereof an effective amount of a polypeptide, which includes the amelin polypeptide sequence (an active enamel substance), in combination with an

appropriate filler material (see col. 15, lines 37-41). The composition can comprise an amelin polypeptide and a physiologically acceptable excipient. The composition can be topically applied (see col. 16, lines 1-7). Cerny et al. disclose that an effective amount of polypeptide can be used to promote or provoke mineralization of hard tissue, including dentin (see claim 7).

A person of ordinary skill in the art would have been motivated to induce the regeneration of dentin over the exposed vital dental pulp tissue to cover the exposed surface and treat a dental defect. A person of ordinary skill in the art would have expected to succeed in regenerating the dentin matrix by applying an effective amount of amelin polypeptide, because Cerny et al. claim the mineralization of dentin upon administering to a patient an effective amount amelin polypeptide. Therefore, it would have been obvious to the person having ordinary skill in the art to topically administer the amelin polypeptide disclosed by Cerny et al. to promote the regeneration of dentin from an exposed dental pulp tissue after a dental procedure (current application, claims 1-3, 5-16, 18, 19, 21, and 22-28).

The applied reference has a common assignee with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not the invention "by another," or by an appropriate showing under 37 CFR 1.131.

26. Claims 1-19, 21, and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gestrelius et al. U.S. Patent 6,503,539 B2 in view of Nakamura, M. et al. (Anat Rec. 238(3): 383-396 (1994)) and Ruch, J.V. et al. (Int. J. Dev. Biol. 39: 51-68 (1995)).

27. Gestrelius et al. disclose an enamel substance that may be used for the preparation of a pharmaceutical or cosmetic composition for healing of a wound, improving healing of a wound, soft tissue regeneration or repair, treating infection, or inflammation (see '539, abstract and disclosure of the invention). Gestrelius et al. discloses an enamel matrix substance selected from the group consisting of enamelins, amelogenins, non-amelogenins, proline-rich non-amelogenins, and tuftelins (see '539, column 11, lines 8-25). The enamel substance is beneficial for the enhancement or improvement of the healing of hard (mineralized) tissue conditions (see '539, column 1, lines 55-59). The enamel matrix proteins typically have a molecular weight of at most about 120 kDa, including proteins with molecular weights between about 5,000 Da to 25,000 Da. The proteins can be in a form of a preparation, wherein the protein content of the enamel substance is in the range of from about 0.05% w/w to 100% w/w (see '539, column 11, line 52 through column 12, line 25). The enamel matrix can be in the form of aggregates, with particle sizes in a range of from about 20 nm to about 1 μm (see '539, column 13, lines 24-30). Gestrelius et al. also disclose the commercial product, EMDOGAIN® (Biora AB), which contains 30 mg of freeze dried enamel matrix protein and 1ml of propylene glycol alginate (see '539, column 11, lines 23-25, and column 23, lines 29-37). Gestrelius et al. does not explicitly disclose the use of an active enamel substance or EMDOGAIN® (Biora AB) for the formation or regeneration of dentin following dental procedures involving exposure of vital dental pulp tissue.

Nakamura, M. et al. disclose the translocation of enamel proteins to odontoblasts (progenitors of dentin) during mouse tooth development. "Amelogenin proteins secreted from preameloblasts were identified along cell processes and cell surfaces of ondontoblasts adjacent to forming dentin extracellular matrix" (see Abstract). Ruch, J.V. et al. also disclose the requirement of preameloblasts on the regulation of dentin production during development (see entire document, particularly figure 8). Therefore, Nakamura, M. et al. and Ruch, J.V. disclose the state of the art that describes the requirement of amelins during dentin formation.

A person of ordinary skill in the art would have been motivated to mimic the developmental biological process of dentin formation disclosed by Nakamura, M. et al. and Ruch, J.V. et al. to use the enamel substances, including EMDOGAIN® (Biora AB), disclosed by Gestrelius et al. in the method of forming or regenerating dentin. A person of ordinary skill in the art would have expected to succeed in using the enamel substance as a pharmaceutical, because Gestrelius et al. use EMDOGAIN® (Biora AB) in patients (see examples 6-13). Therefore, it would have been obvious to the person having ordinary skill in the art to use the EMDOGAIN® (Biora AB), disclosed by Gestrelius et al. as a pharmaceutical composition for the formation or regeneration of dentin following a dental procedure involving exposure of dental pulp tissue (current application, claims 1-19, 21, and 22).

28. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gestrelius et al. U.S. Patent 6,503,539 B2 in view of Nakamura, M. et al. (Anat Rec. 238(3): 383-396 (1994)) and Ruch, J.V. et al. (Int. J. Dev. Biol. 39: 51-68 (1995)) as applied to claims 1-19, 21, and 22 above, and further in view of Sasaki, T. and Kido, H. (Archs oral Biol. 40(3): 209-219 (1995)).

Gestrelius et al., Nakamura, M. et al. and Ruch, J.V. et al. are discussed in the 35 U.S.C. 103(a) rejection above. The references do not disclose the use of hyaluronic acid as a pharmaceutically acceptable excipient.

Sasaki, T. and Kido, H. disclose the use of high molecular-weight hyaluronic acid as a capping agent on amputated rat molar dental pulp. The results show that hyaluronic acid be used as a capping agent for reparative dentine formation on dental pulp (see Abstract).

A person having ordinary skill in the art would have been motivated to use hyaluronic acid as a capping agent to prevent bacterial infection of the exposed dental pulp tissue during the healing process. Therefore, it would have been obvious to the person having ordinary skill in the art to use hyaluronic acid as a pharmaceutically acceptable excipient, because Sasaki, T. and Kido, H. disclose the use of high molecular-weight hyaluronic acid as a capping agent during the healing of amputated rat molar dental pulp.

Conclusion

29. No claims allowed.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anand U. Desai, Ph.D. whose telephone number is (571) 272-0947. The examiner can normally be reached on Monday - Friday 7:00 a.m. - 3:30 p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jon P. Weber can be reached on (517) 272-0925. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

September 26, 2005

JON WEBER
SUPERVISORY PATENT EXAMINER